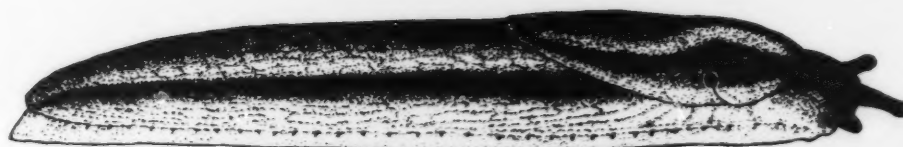


A GUIDE TO IDENTIFYING NEWFOUNDLAND SLUGS

By John E. Maunder



Curatorial Reports of the Newfoundland Museum
Natural History Series No. 1
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1.

The Island of Newfoundland is home to eight species of slug, representing two distinct families. One species, the Marsh Slug Deroceras laeve, is native to both Eurasia and North America. The other seven are native only to Europe, and have been introduced to North America over the years by humans.

Slugs can be found all over the Island in damp places. They commonly occur underneath damp cardboard, logs, boards, rocks and assorted refuse; and in moist vegetable and flower gardens. They frequent woods, but seem to prefer grassy areas. On damp nights, slugs often roam freely over the ground.

This guide should allow any careful observer to identify nearly any slug found in Newfoundland. The identification "keys" are based almost exclusively on characters that can be observed without dissection or other preparation. The keys are particularly useful for live material, though they include aids to identifying preserved material as well.

For those unfamiliar with identification keys, the following instructions are offered. Each numbered section of the key presents two contrasting descriptions. You must choose the description that most agrees with the specimen in question. Trailing each description is either a scientific name or a number. If you arrive at a name, you have probably identified your slug. If you arrive at a number, proceed to the section of the key indicated by that number and continue in this way until the slug is tentatively identified. Comparison of your slug with the illustrations is important for final confirmation.

When starting out, you may find it helpful to gather together GROUPS of slugs which seem very much alike, and look at each as you work through the keys. This will help you to see variability between specimens that might otherwise prove confusing. Patience and careful observation are essential.

It should be noted that slugs present unusual challenges to the would-be identifier. They are muscular creatures which can vary their proportions to a startling degree. The figures in this guide show slugs posed at an average travelling pace. Color and pattern is surprisingly variable, especially between different geographic regions. Small (young) specimens can be difficult to identify, and should be compared with larger, older specimens from the same area. Expect to occasionally encounter a slug that is so atypical that positive identification seems impossible.

Good luck and good slugging!

John E. Maunder
Curator of Natural History
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SLUGS OF NEWFOUNDLAND - A SYNOPSIS

FAMILY ARIONIDAE

Arion circumscriptus Johnston 1828 - Bourguignat's Slug**
 SYNONYM Arion fasciatus (Nilsson, in part, 1822)*

Arion hortensis Férussac 1819 - Garden Slug

Arion subfuscus (Draparnaud 1805) - Dusky Slug

Arion ater (Linnaeus 1758) - Black Slug

FAMILY LIMACIDAE

Deroceras laeve (Müller 1774) - Marsh Slug
 SYNONYM Agriolimax campestris (Binney 1842)
Agriolimax laevis (Müller 1774)

Deroceras reticulatum (Müller 1774) - Field Slug
 SYNONYM Agriolimax agrestis (Linnaeus 1758)***
Agriolimax reticulatus (Müller 1774)
Deroceras agrestis (Linnaeus 1758)***

Limax maximus Linnaeus 1758 - Great Slug

Limax marginatus Müller 1774 - Tree Slug
 SYNONYM Lehmannia marginata (Müller 1774)
Limax arborum Bouchard-Chantereaueux 1837

(*) Synonyms recorded here are those to be encountered when dealing with literature for this area. The listing is by no means complete for broader use.

(**) Common names are British, from Ellis (1969).

(***) Deroceras agrestis / Agriolimax agrestis is now considered to be a distinct species from Deroceras reticulatum.

QUICK KEY TO TYPICAL, ADULT SLUGS:

(This Quick Key will not work very well for many less typical or younger slugs; proceed to Detailed Keys to verify any "identifications" made here).

- | | |
|--|-----------------------------|
| 1. Breathing pore on right front or
right mid-section of saddle..... | 2. |
| Breathing pore on right rear
section of saddle..... | 5. |
| 2. Large, robust, bumpy, and an even
black color..... | <u>Arion ater</u> |
| Smaller, smoother, and not an even
color..... | 3. |
| 3. With a single line of tubercles form-
ing a thin, light, discrete line
down center of back (fig. 4a)... | <u>Arion circumscriptus</u> |
| Without the above character..... | 4. |
| 4. Small; sole distinctly orange-yellow;
foot-fringe without vertical,
dark lines..... | <u>Arion hortensis</u> |
| Medium size; sole may be yellowish,
but not distinctly so; foot-
fringe with vertical, dark
lines..... | <u>Arion subfuscus</u> |
| 5. With distinct spots, or bands, or
with a pale area running down
center of back (fig. 4b)..... | 6. |
| Without such patterns, though may
have mottling..... | 7. |

5.

6. Pale area down center of back; no distinct lines on mid-to-lower parts of sides; no spots..... Limax marginatus
Spots or strong random patterning on saddle..... Limax maximus
7. Basic color tan to off-white, with brownish mottling; sole relatively broad and brownish-yellow to off-white..... Deroceras reticulatum
Basic color dark and even; very glossy; sole brownish to brownish-grey, and very narrow.. Deroceras laeve

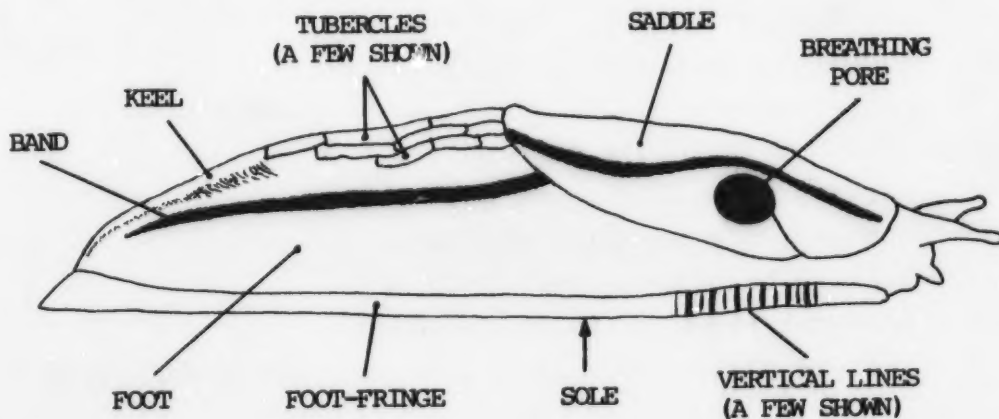


FIGURE 1: Parts of slug anatomy mentioned in this article.

DETAILED KEY TO THE GENERA OF NEWFOUNDLAND SLUGS:*

1. Slugs with breathing pore in the
right FRONT or right MID-PORION
of the saddle. (Family
Arionidae)..... GENUS Arion
- Slugs with breathing pore in the
right REAR portion of the
saddle. (Family Limacidae)..... 2.
2. Slugs with dark or darkish bands or
spots on the sides of the body
AND/OR with PROMINENT, DISCRETE,
dark, regular or irregular SPOTS
or strong random patterning on
saddle AND/OR with a definite
PALE AREA down the center of
the back (fig. 4b). Hind end
sloping to a point on fully
extended individuals..... GENUS Limax
- Slugs WITHOUT the above distinctive
markings, although some may have
considerable brownish mottling,
dotting or splotching. Hind end
somewhat blunt on fully extended
individuals..... GENUS Deroceras

(*) Separate keys are provided for each genus, on the pages
which follow.

DETAILED KEY TO THE GENUS ARION:

1. ROBUST. Large (up to 15 cm).

Tubercles longish, COARSE and RAISED. Usually a SOLID COLOR like BLACK or yellow all the way down the sides. Juveniles MAY have a band along the upper part of each side and generally become lighter towards the sole (if you suspect a juvenile, see description of sole pattern and coloration below). Foot-fringe usually with numerous, short VERTICAL, DARK LINES and associated distinct relief (see also Arion subfuscus). The pattern and/or the coloration of the foot-fringe usually EXTENDING ONTO at least the lateral fields of the sole. Breathing pore unusually large when fully open. Slime colorless in dark specimens or yellowish in yellow specimens. Eastern AVALON PENINSULA..... Arion ater

MEDIUM to SLIM build. Smaller (less than 7 cm). Tubercles medium to small, and not much raised. A dark or darkish BAND along the upper part of each side AND/OR

a distinct division between
darker upper part and lighter
lower part (see also Arion ater) 2.

2. Medium-small (up to 3.5 cm). The
SINGLE LINE of tubercles running
down the CENTER OF THE BACK form
a discrete, THIN, LIGHT-COLORED
LINE (fig. 4a) which appears
slightly RAISED (may require
very close examination, and may
be absent or very indistinct in
some older individuals). Over-
all color is usually greyish to
blackish above, becoming paler
on the sides. The BAND along
the right side is clearly
positioned ABOVE the level of
the breathing pore. The foot
is usually noticably BROAD and
splayed out, expecially in
contracted individuals (giving
the body a "bell-shaped" cross-
section). There may VERY
OCCASIONALLY be INDISTINCT
vertical dark lines on the
normally PLAIN, LIGHT-COLORED
foot-fringe (though such lines
are not accompanied by matching
relief as in A. ater or A.
subfuscus). The SOLE is
"PORCELAIN-WHITE". Slime is
colorless.....

Arion circumscriptus

The tubercles down the center of the back not special. The BAND along the right side (when present) usually passes THROUGH the breathing pore, or at least an arm of the band or a faint area of pigment reaches down to the vicinity of the pore (in some specimens of A. subfuscus the band appears not to reach the breathing pore). Foot of medium to narrow width. Sole not "porcelain-white". Slime yellow or yellowish..... 3.

3. MEDIUM robustness. Size to at least 6 cm. Color of saddle of live specimens often a dark BROWNISH-YELLOW-ORANGE to the color of "MEDIUM BEER", and sometimes distinctly lighter than body color. Bands along sides not particularly distinct; occasionally absent. Band on mantle may or may not appear to pass through breathing pore; it usually does on dark specimens. Foot medium width to slightly broad. Foot-fringe almost always with numerous short vertical DARK LINES (best seen on mature individuals), which DO NOT extend onto the face of the more or less evenly colored sole.

Where vertical lines are absent (or found only near the tail-end where they MAY be reduced to light NARROW grooves with scattered pigment specks on either side), the foot-fringe usually exhibits a STRONG RELIEF of VERTICAL GROOVES.

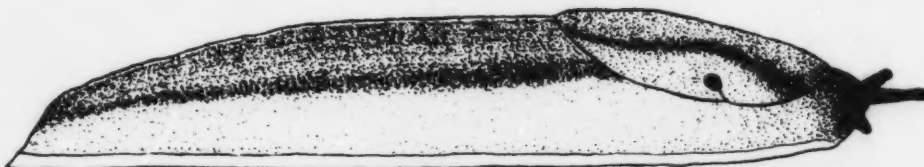
Sole a very pale, mucousy yellow-grey color. Slime PALE yellow to PALE orange. Smaller, slimmer, preserved specimens may be hard to tell from A.

hortensis; though from above, the body of A. subfuscus usually can be seen to end in a "nose-like" tip above the tail-end of the foot (which usually has a SHALLOW, NARROW groove to the tip). A very variable species.. Arion subfuscus

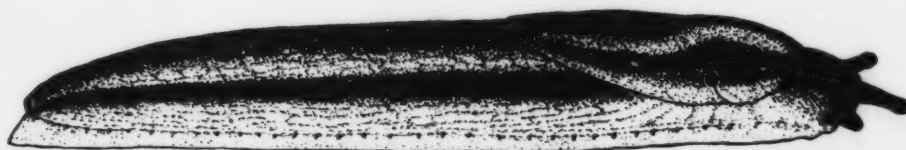
SLIM. Size up to 3 cm. Back has a broad, "even" look; the tubercles somewhat resembling the wrinkles of a fingertip pinched together front-to-back. Color of live specimens is greyish to rather DARK, and uniform above; a distinctive yellow and black speckling in a "salt and pepper" pattern is visible on saddle (under a lens).

Preserved specimens usually, but not always, a bluish-grey color above. BANDS along the side quite DISTINCT and passing through breathing pore. Foot fairly narrow. Foot fringe narrow and ungrooved, and without vertical dark lines (there may be some SMOOTH pigmentation, particularly near the tail-end, or a number of dark DOTS where foot-fringe and side of body meet). Sole YELLOW or ORANGE; primarily because of the color of the slime which is usually a strong orange-yellow (especially when the slug is irritated). Useful field-marks are the often grotesque WAVES OF CONTRACTION that advance along the entire body of a disturbed crawling animal, and a tendency for disturbed animals to writhe and twist in CORKSCREW fashion. Smaller, contracted preserved specimens may be hard to tell from Arion subfuscus; though from above, the body can usually be seen to end in a smoothly rounded or even a slightly squared tip above the tail-end of the foot (which is usually narrowly grooved to the tip to resemble the top of a deer's hoof). A variable species..... Arion hortensis

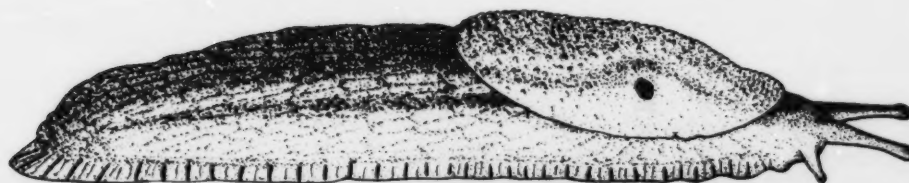
FIGURE 2.



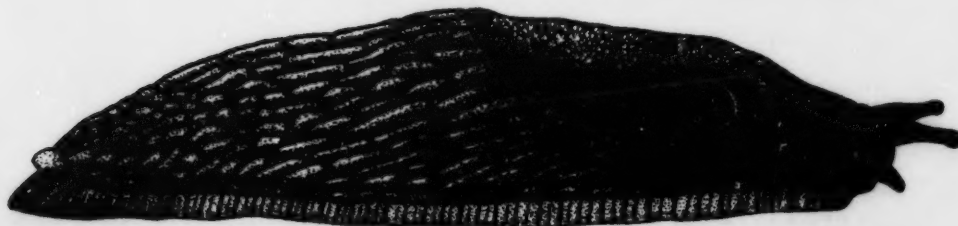
Arion circumscriptus



Arion hortensis



Arion subfuscus



Arion ater

DETAILED KEY TO THE SLUG GENUS LIMAX:

1. LARGE (up to 15+ cm). Prominent KEEL on back near tail. At least a few prominent, discrete, DARK, regular or irregular SPOTS on saddle or, failing that, a strong random patterning; but NO banding on SADDLE. Body variously banded or longitudinally patterned. Slime colorless and somewhat sticky. Eastern AVALON PENINSULA.....

Limax maximus

MEDIUM size (up to 6 cm). Back with a low "V-shaped" ridge, more prominent near tail. A BAND along the upper part of each side may be very HARD TO SEE on WET live specimens (which tend to be greyish, gelatinous and somewhat translucent). On drier, or preserved specimens, bands are more easily seen; those on the saddle being a distinctive "lyre-shape". There are NO SPOTS. The best field mark, especially for wet, live specimens, is the PALE AREA running down the CENTER OF THE BACK (fig. 4b). Slime is copious and watery. Head does

14.

not protrude much in front of
mantle. Eastern AVALON

PENINSULA..... Limax marginatus

DETAILED KEY TO THE SLUG GENUS DEROCERAS:

1. MEDIUM-sized slug (up to 4 cm). Keel on back NEAR TAIL fairly prominent. Surface wrinkles (tubercles) prominent in some animals, less prominent in some others, but generally not smooth. Base color usually whitish-tan to whitish (due to numerous WHITISH PARTICLES in the skin, visible with a lens). Overall color usually from whitish-tan to brownish-grey, depending on degree of brownish mottling or splotching; unusual color forms do exist. Skin OPAQUE, and not overly wet-looking. Border of BREATHING PORE CONSPICUOUSLY UNPIGMENTED. Often quite STOUT. Sole PALE brownish-yellow to off-white, and not particularly narrow (fig. 4c). Slime clear, but becoming WHITISH when slug is irritated (i.e. as when poked with a pencil). Not very active. A very variable species. Small, dark, smooth individuals MAY be confused with Deroceras laeve. and MAY require dissection for an absolute

identification (the thick,
stubby penis has a "hard lump"
inside, and 1-4 short terminal
appendages; (fig. 5).....

Deroceras reticulatum

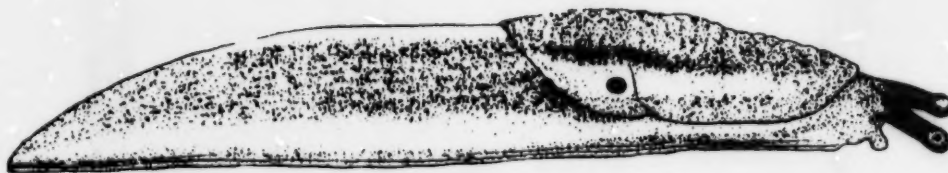
SMALL slug (up to 2.5 cm). Keel on
back near tail rudimentary.
Surface wrinkles (tubercles)
relatively SMOOTH. Usually a
very EVEN, DARK color (usually
BROWN or BLACK); though some-
times lighter. Usually not with
any significant mottling or
splotching. Skin usually
somewhat TRANSLUSCENT. Slug has
a WET, GLOSSY, SMOOTH, "DIPPED-
IN-SYRUP" look. Border of
breathing pore not nearly as
conspicuous as in Deroceras
reticulatum. Rather SLENDER.
Sole BROWN to BROWNISH-GREY and
noticably NARROW (fig. 4d).
Slime watery. Very ACTIVE.
Larger, lighter individuals (and
preserved ones) MAY be confused
with Deroceras reticulatum, and
MAY require dissection for an
absolute identification (the
thin, serpentine penis has no
"hard lump" inside, and only one
small terminal appendage, which
may be hard to distinguish;
(fig. 5).....

Deroceras laeve

FIGURE 3.



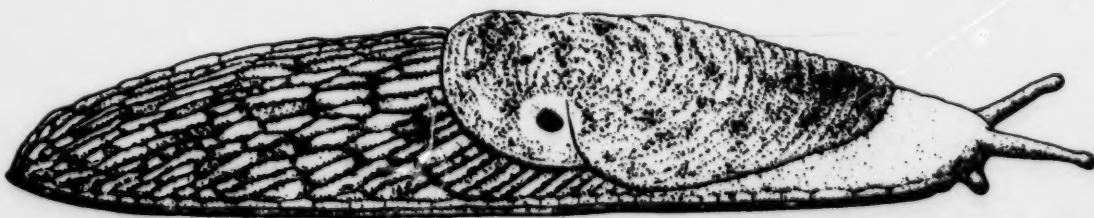
Limax maximus



Limax marginatus



Deroceras laeve



Deroceras reticulatum

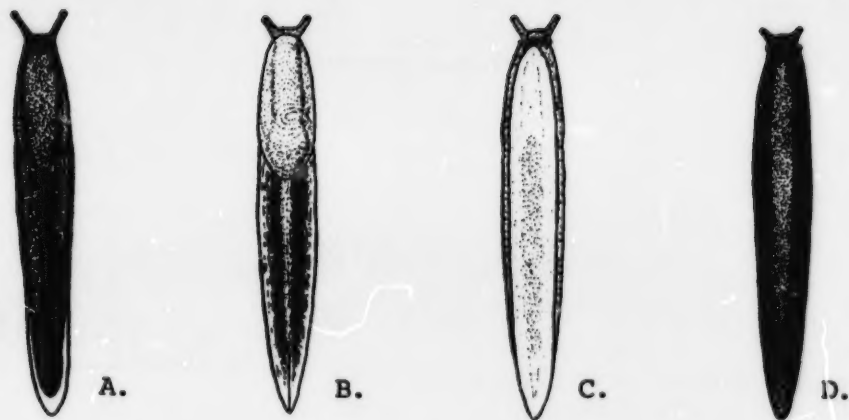


FIGURE 4: A. Arion circumscriptus showing single, light line of tubercles down center of back. B. Limax marginatus showing lightish area down centre of back. C. Deroceras reticulatum showing relatively broad, lightish sole. D. Deroceras laeve showing relatively narrow, well-pigmented sole.

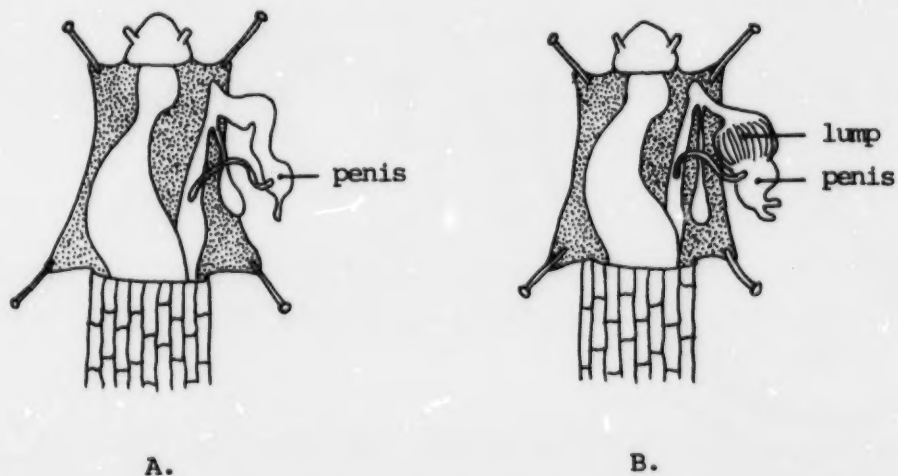


FIGURE 5: Dissections of Deroceras laeve (A) and Deroceras reticulatum (B), showing saddle removed and underlying body cavity exposed. Skin is pinned back. Gut is mass at left. Reproductive structures are exposed on right. Penis of D. laeve is thin, serpentine, has no "lump" inside, and has only a single terminal appendage (or none). Penis of D. reticulatum is thick, stubby, has a hard "lump" inside, and has 1-4 short terminal appendages. These drawings are diagramatic; the reproductive structures of slugs are very variable.

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